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of bone, using the word *plasticity* not in a physical sense merely, but to include absorption under pressure, will probably account for much structure in the foot and elsewhere, especially the connection with the joints, and in the fields of variation and correlation." In the second proposition he says that facts have been adduced by him which are inconsistent with the theory that the size of bones has been increased by the stimulus they receive, and with the theory that regions of growth are determined by regions of pressure and strain. "The testimony of the literature as to the latter point he says is conflicting." I have shown that the supposed conflict is due to a misunderstanding on the part of the author of this paper. The proposition that pressure does not affect growth is in contradiction to the admission made by the author in his first proposition, where he admits that pressure determines structure; for in such change of structure there is always growth. Finally Mr. Cary remarks "That race changes follow those produced in the individual life, or that they are directly caused by their mechanical surroundings, I do not think it has been satisfactorily shown." The fact that the characters of bone structure admitted by Mr. Cary to have had a mechanical origin appear in the young before birth, is evidence that race characters are produced, and that they are produced by mechanical surroundings.

Such criticisms as are contemplated by the author of the paper reviewed above, are important and are what the subject needs. It is along the line followed by him that the ultimate demonstration of the problems involved will be made. We trust that we shall hear from him again in this field, and that in his labors he will be well supplied with the phylogenetic details as a foundation.

E. D. COPE.

Earle on the Species of Coryphodontidæ.⁶—In preparing this paper Mr. Earle had the advantage of the use of the material in the collections of the New York American Museum of Natural History, and the private collection of Professor E. D. Cope. He presents us with a brief résumé of the results of his comparisons, and adds considerably to our knowledge of the characters of the skeleton and dentition of some of the species. He gives a list of the described species, which number twenty-one, and which were referred by Cope to five genera. He concludes that these should be reduced to ten

⁶Revision of the species of Coryphodon, Art. xii, Bull. Am. Mus. Nat. History New York, iv, pp. 149-66; Oct. 18, 1892.

species and three genera, viz., *Coryphodon* Owen, *Ectacodon* Cope, and *Manteodon* Cope.

Mr. Earle's conclusion that the supposed genus *Bathmodon* is not distinct from *Coryphodon* may be well founded, as the material at his disposal is better than mine. The difference in the forms of the astragali of the two types is, however, greater than is usual in a single genus, and is seen in material from all localities. The character on which the genus *Metalophodon* rests is a strong one, provided it be constant. Mr. Earle says it is not constant, and if his material demonstrates this to be the case the genus must be abandoned. I do not, however, think that he demonstrates his case in the paper under review.

Let us now see the evidence on which he reduces my reputed twenty-one species to ten. In the first place he fails to state that I had already reduced two of the names to the rank of synonyms, leaving nineteen species to my credit; that is to say, nine specific names remain which are alleged to be superfluous. One of these is, however, admitted to be good by Mr. Earle. He refers *C. sinus* and *C. latidens* to *C. elephantopus*, but says also that the former two are "quite radically distinct." Both cannot, therefore, be synonyms of the same species unless "things *not* equal to one another are equal to the same thing." I described the lower molars which probably belong to the *C. elephantopus*, and they are totally different from those of the *C. latidens*. The superior last molar of *C. sinus* is different from that of the *C. elephantopus*. The three species are in my opinion well distinguished. This reduces the supposed superfluous names to seven.

Mr. Earle does not admit the *Metalophodon armatus* for reasons which are insufficient. As I took the greater part of the dental series from one decayed skull, and an almost equally large series from a second skull, and as the two series confirm each other, I believe the species to be one of the most distinct of the family. This reduces the supposed excess to six. As to the *C. cuspidatus*, the last inferior molar teeth of three individuals are now known, and they confirm each other not only by their characters but by their inferior size. Mr. Earle admits this species with doubt. The *C. marginatus* is rejected by him as probably founded on a milk tooth of *C. anax*. But it is not a milk tooth,⁶ but an unworn permanent tooth of a species of hardly half the bulk of the *C. anax*. *Coryphodon* did not possess milk teeth of this form. The surplus is now five names. There are three forms of approximately similar and smaller size, viz., *C. latipes*, *C. molestus* and

⁶I have represented the milk dentition of *Coryphodon* on Plate liv, fig. 3, of the U. S. G. G. Survey, Report Capt. Wheeler, iv, 1875.

C. simus, which Mr. Earle refers to the *C. elephantopus*, but of which the second and third do not exhibit the form of the last superior molar which he regards with me as characteristic of the latter species. It is not unlikely that *C. simus* and *C. molestus* are one and the same, but the evidence is not yet in favor of their being identical with the *C. marginatus*. It is probable that these specimens represent at least one distinct species of rather small size.

In conclusion I think that Mr. Earle has been hasty in his wholesale reductions, and that instead of ten species in the American Wasatch beds there are at least fifteen recognizably described. It is evident that more material and more research are necessary before a larger number than this can be demonstrated and before those which are admitted can be fully defined. A considerable part of Mr. Earle's conclusions may be due to the fact that, as he says, he has "labored under the disadvantage of not being able to study any of the types of *Coryphodon* from New Mexico which have been described by Professor Cope."

The *Coryphodontidæ* were the predominant type of the Wasatch (Suessonian) Eocene, and they were probably numerous in species and varied in character. If the bones and teeth of the existing African antelopes were mixed up and discovered piecemeal, they would puzzle naturalists, who would at first be incredulous as to their representing over forty species.—E. D. COPE.